

Appl. No. : 10/759,925
Filed : January 16, 2004

AMENDMENTS TO THE CLAIMS

Please amend the claims as follow:

1. (Currently Amended) A method of cleaning a chemical vapor deposition (CVD) reaction chamber with cleaning gas provided through a remote plasma discharge chamber, comprising:

dissociating cleaning gas within the remote plasma discharge chamber by applying energy with a power of less than about 3,000 W, wherein said dissociated cleaning gas is exposed to an aluminum alloy wall of the remote plasma discharge chamber;

supplying activated species from the remote plasma discharge chamber to the reaction chamber through a piping; and

removing adhered deposits from CVD reactions on a wall of the reaction chamber at a rate of greater than 2.0 microns/minute.

2. (Original) The method of Claim 1, wherein removing adhered deposits comprises removing adhered silicon nitride deposits.

3. (Original) The method of Claim 1, wherein the cleaning gas comprises fluorine-containing gas and the activated species comprises fluorine active species.

4. (Original) The method of Claim 1, wherein the applied energy has a frequency between about 300 kHz and 500 kHz.

5. (Original) The method of Claim 1, wherein supplying activated species comprises flowing NF_3 through the remote plasma discharge chamber at a rate between about 0.5 slm and 1.5 slm.

6. (Currently Amended) A method of cleaning a chemical vapor deposition (CVD) reaction chamber with cleaning gas provided through a remote plasma discharge chamber, comprising:

forming a plasma with active species by applying energy with a power of less than about 3,000 W to a cleaning gas within the remote plasma discharge chamber, wherein the dissociation of the cleaning gas is performed in a remote plasma discharge chamber so that the plasma is exposed to an aluminum alloy wall of the remote plasma discharge chamber;

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transporting the active species from the remote plasma discharge chamber to the reaction chamber through a piping; and

removing adhered silicon nitride deposits from CVD reactions on a wall of the reaction chamber at a rate of greater than 2.0 microns/minute.

7. (Original) The method of Claim 6, wherein the applied energy has a frequency between about 300 kHz and 500 kHz.

8. (Original) The method of Claim 6, wherein supplying activated species comprises flowing NF_3 through the remote plasma discharge chamber at a rate between about 0.5 slm and 1.5 slm.

9. (Original) The method of Claim 6, further comprising opening a valve on the piping after conducting a CVD reaction and prior to supplying activated species.

10. (Previously Presented) The method of Claim 9, wherein opening a valve comprises withdrawing a valve body completely from a path to form an opening substantially as wide as internal surfaces of the piping.

11. (Original) The method of Claim 9, further comprising closing the valve after removing the adhered silicon nitride deposits.

12. (Currently Amended) A method of removing deposits from a reaction chamber of a chemical vapor deposition device, the method comprising:

supplying a cleaning gas containing fluorine to a remote plasma discharge chamber;

applying an energy in the remote plasma discharge chamber of less than 3000 W to the cleaning gas to form a plasma with fluorine active species, wherein the application of the energy is performed in a remote plasma discharge chamber that comprises a wall of aluminum alloy, wherein said fluorine active species can contact said wall;

transporting the fluorine active species from the remote plasma discharge chamber to the reaction chamber through a piping; and

removing adhered silicon oxide deposits from CVD reactions on a wall of the reaction chamber at a rate of greater than or equal to about 1.5 microns/minute.

13. (Canceled)

14. (Canceled)

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15. (Previously Presented) The method of Claim 1, wherein removing adhered deposits on the wall of the reaction chamber comprises removing adhered tungsten deposits.

16. (Original) The method of Claim 12, wherein supplying the cleaning gas comprises supplying carbon tetrafluoride (CF₄).

17. (Original) The method of Claim 12, wherein supplying the cleaning gas comprises supplying nitrogen trifluoride (NF₃).

18. (Original) The method of Claim 12, wherein applying an energy comprises applying an energy of between about 2,500 W and 3,000 W.

19. (Original) The method of Claim 12, wherein the applied energy has a frequency between about 300 kHz and 500 kHz.

20. (Original) The method of Claim 12, further comprising opening a valve on the piping after conducting a CVD reaction and prior to supplying activated species.

21. (Previously Presented) The method of Claim 20, wherein opening a valve comprises withdrawing a valve body completely from a path to form an opening substantially as wide as internal surfaces of the piping.

22. (Currently Amended) The method of Claim 20, further comprising closing the valve after removing the adhered silicon ~~nitride~~oxide deposits.